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GERMANY.

Report on tetanus antitoxin.

FRANKFORT, *November 16, 1896.*

One by one the diseases which have hitherto defied the skill of physicians are yielding to the persistent attack of modern science. Since the successful treatment of diphtheria by subcutaneous injections of antitoxic serum was demonstrated—hardly three years ago—it has been confidently predicted that sooner or later all diseases which result from the action of a poison secreted in the blood by a special and characteristic bacillus would be conquered by similar means.

From the evidence now presented it would appear that tetanus, one of the most sinister and stubborn of human maladies, if not already conquered, is in a fair way to be successfully overcome. In the Deutsche Medicinische Wochenschrift (Berlin) for October 23 appears a joint announcement by Prof. Dr. von Behring, of diphtheria-antitoxin fame, and Professor Knorr, of Marburg, describing the qualities and best methods of using the new tetanus antitoxin, which is now prepared under Government supervision as a commercial product by the Farbwerke at Hoechst-on-Main, and offered for use by medical practitioners under the same conditions as diphtheria antitoxin from the same source.

Tetanus, as is well known, is an exceedingly painful and hitherto usually fatal disease caused by blood poisoning, generally the result of a wound. It is believed by physicians to be caused by the introduction into the system of a minute organism which rises from the ground in certain localities, so that the prevalence of tetanus varies greatly even in different districts of the same country. At all events, the disease has its characteristic microbe, which has been recognized, isolated, described, and reproduced by artificial culture. The distinctive symptom of tetanus is a persistent spasm of the voluntary muscles, aggravated by light, noise, or other disturbing influence to which the patient may be subjected. These spasms may affect any muscular portion of the body, but when, as is often the case, the maxillary muscles are principally attacked, the resulting malady is known as lockjaw.

The tetanus antitoxin described by Professor Behring and Dr. Knorr is similar in nature, action, and in the methods of its preparation to the antitoxin of diphtheria. It is prepared and put up for use in two forms, viz, as a dry powder, which is used for the treatment of developed cases of tetanus in men and animals, and as a liquid solution, which is employed for prophylactic purposes. Its strength or degree of efficiency is measured, like that of antidiphtheritic serum, by antitoxic units. The dry antitoxin is designated as a hundredfold normal antitoxin—that is, 1 gram of the preparation contains 100 units of antitoxic power; in other words, is sufficient to neutralize 100 grams of the normal poison of tetanus. It is put up for commerce in vials containing 5 grams each, and the contents of one such vial are theoretically sufficient for the cure of a developed case of tetanus. It is dissolved in 50 cubic centimeters of sterilized water at a temperature of 40° C. and injected hypodermically at a single dose. In the treatment of horses, the injection is made into a vein, by which the full action of the antitoxin is accelerated by about twenty-four hours, and this method of injection may even be employed with human patients in very severe cases or where the treatment is commenced at a late and perilous stage of the disease. To insure favorable results, the injection should be made, if possible, within thirty-six hours after the presence of tetanus is definitely indicated. The liquid solution is protected from contamination by germs in the atmosphere by a small admixture of phenol. The dry preparation, on the other hand, requires no such antiseptic while in that form, but when dissolved in water it becomes subject to deterioration, which may be prevented by the addition of 1 per cent of chloroform.

The tetanus solution is of fivefold strength, that is, 1 gram of the liquid contains five antitoxic units, and in this form it is put up in sealed 5-gram vials. In presence of wounds which give reason to fear lockjaw or other form of tetanus, a small subcutaneous injection of the solution is made, the quantity used being proportionate to the condition of the patient and the time that has elapsed since the injury was received. In all cases, the wound should be antiseptically treated, so as to prevent as far as possible the further generation of poison in the blood.

Tetanus is a disease of seldom occurrence in this section of Germany, and opportunities to test the remedy in actual practice are comparatively rare. One such case has been recently treated at the Hospital of the Holy Spirit, in Frankfort, the record of which is officially and minutely given.

On the 19th of September last, a coppersmith (L. M.), 25 years of age and resident in

Frankfort, experienced after exposure to thorough wetting severe pains and stiffness in the muscles of the neck and throat. Two days after the first symptoms appeared he came under treatment by a physician, who kept the patient in bed and administered chloral and salicylate of soda. The symptoms of tetanus continued to develop, and on the night of the 29th of September became so marked and violent that on the following day the patient was transferred to the hospital. A careful examination revealed a small cut or scratch under the right ear, then nearly healed, and so slight in outward appearance that it had passed almost unnoticed. At the time of admission to the hospital the patient was growing rapidly worse. The chin was twisted far to the left, the head drawn backward and immovable, and the muscles of the body, especially the back and abdomen, were hard and tensely drawn. The patient was isolated in a dark room and treated with subcutaneous injections of morphine, which gave no relief. The slightest noise or disturbance, such as the entrance of the physician or nurse into the darkened room, induced severe spasms, and the condition of the sufferer continued to grow steadily worse. At 4 o'clock in the afternoon of October 1 a prolonged spasm of intense severity left no further doubt of a fully developed case of tetanus, and half an hour later 5 grams of the hundred-unit antitoxin, dissolved in 50 grams of water, were injected hypodermically at three places on the breast.

During the evening of the same day, a slight but definite improvement was observed, and this continued throughout the following day, the spasms being fewer and of shorter duration than before the antitoxin had been administered. This condition was maintained from the 3d to the 6th of October, when the acute symptoms gradually returned and by 9 o'clock in the evening became so severe that a second dose of 4 grams of normal antitoxin was administered as before, with the result that before the next morning the muscles began to relax, the spasms became lighter and less frequent, and from that time improvement was so rapid and sustained that on the 23d of October, sixteen days after the second injection of antitoxin, the patient was convalescent, and, at his own request, was discharged from the hospital.

This, in the opinion of the physicians in charge, was a typical and conclusive case, in which life could not have been saved by any other treatment previously known, and in which the course of the disease might unquestionably have been arrested and greatly shortened had the antitoxin been used when the patient first came under medical treatment instead of ten days later, when the case had become one of acute and fully developed tetanus.

It is, of course, too soon to estimate the exact prophylactic or therapeutic value of the new remedy. That can only be determined by a long series of observations in actual practice, which will be made as rapidly as the comparative rarity of the disease itself will permit. Thus far the antitoxin has been used experimentally, both in this country and in France, with horses, cattle, guinea pigs, mice, etc., and from these tests, and the hospital case above described, the indications are that its use entails no injurious result. The antitoxin is prepared with extreme care, subjected to rigid inspection and control at the imperial testing laboratory at Steglitz, and with this guaranty is placed within reach of bacteriologists and medical practitioners in all countries.

FRANK H. MASON,
United States Consul-General.

INDIA.

Report on the prevalence of bubonic fever (plague) in Bombay.

BOMBAY, *December 24, 1896.*

SIR: The exodus of natives from the city still continues and business in the native town is almost at a standstill.

Population last census	821,764
Total number of deaths for corresponding week last year	450
Mean number of deaths per week from all causes, previous five years	470
Present population (estimated 250,000 have left city)	571,764
Proportionate number of deaths based on number for previous five years	327
Total number of deaths reported for week ended December 22, 1896	1,416
Deduct, as above, for average previous five years	327
Number of deaths last week that may be attributed to plague	1,089